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**News Editor:**

David Kelly (01-930 3271)

**Software Editor:**

Graham Taylor

**Sub-editor:**

Ninette Sharp

**Editorial Assistant:**

Therese Lucy

**Advertisement Manager:**

David Lake (01-838 2246)

**Advertisement Executive:**

Alastair Macintosh (01-830 3280)

**Managing Editor:**

Duncan Scott

**Publishing Director:**

Jerry Ireland

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## Editorial

British software writers have long  
been highly regarded by the rest of the world.  
Many of our top business and  
applications programmers are now  
working abroad, tempted by salaries  
and conditions that UK firms cannot  
match.

Now it would appear that British  
games programmers are about to  
take the same path as their more  
business-oriented predecessors.  
Parker Brothers placed an advertisement  
in this week's Sunday Times for  
"Hardware and software engineers —  
the challenge in electronics is the  
games people play". The US-based  
firm is offering up to £35,000 a year for  
graduate programmers, with three  
years experience of Z80, 6809 and  
6800 assembly languages, who are  
willing to move to Boston.

With the *Times Sinclair 2000* due to  
be launched in the US in June, there is  
clearly a demand for innovative pro-  
grammers. British software for the  
*ZX81/T5100* is already selling well in  
the US — and most of the major UK  
firms have already tied up distribution  
deals for their Spectrum software.

While the incentives for budding  
games programmers to move abroad  
are clearly great, I cannot help hoping  
they will be resisted. Rather than  
exporting our top programmers, I  
would prefer to see us exporting our  
top programs.

## Next Thursday

Do you know what it takes to rule a  
country? Could you defend a state  
against its enemies without starving  
your own population to death? Find out  
next week in *King Crook*, a new game  
for the suspended Vic 20.

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# TELEWRITER™

## the DRAGON 32 Word Processor

### TELEWRITER

Telewriter is the powerful word processor designed specifically for the DRAGON 32 Computer. It can handle almost any serious writing job and is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, newsletters, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

### 80 x 24 DISPLAY

The DRAGON 32 is an incredible powerful and versatile computer, but for text editing it has some major shortcomings. The small 32 characters by 16-line screen formats shows you one line of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Lowercase is in place of lower case just with confusion.

Telewriter eliminates these shortcomings with no hardware modifications required. By using soft fonts alone, Telewriter creates a new character set that has both lower case letters, and pairs of lines of 21 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the DRAGON 32's standard display.

### FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key or single key plus control key, fast, and easy to remember. There is no need to search for weird menu icons and dozen menus and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, easier travel. You can jump to the top or bottom of the text, and beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the numbers you enter move you cleanly to the next.

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a fast

... read a stored character

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in memory, and leaves you where the budget is full.

### FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify left, right, top, and bottom margins, line spacing and lines per page. These parameters can be set before printing so they can be dynamically modified during printing with simple format codes in text.

Telewriter will automatically number all pages of your want and centre lines. It can print any number of text files from memory without user intervention. You can tell it to start a new page anywhere in the text or pause in the formatted text page.

You can print all or any part of the text buffer, above the printing at any point, and there is a "Type now" feature which allows you to type a night at your printer. Because Telewriter lets you control numeric control codes directly from the menu or during printing, it works with any printer (Tandy, Rydon, MVS-80, Chiclet, NEC 8021, C, Tech 8010, Cypress, etc.)

Germany: Sun Computer TPA-1, TPC-1.

There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

### CASSETTE INPUT/OUTPUT

Because the Telewriter makes using cassette please possible, you can still have a powerful word processor without the major additional cost of a disk. The advanced quest to handle will search in the forward direction till it finds the first valid line, so there's no need to keep typing a bad command when you are lost in your tape. The Verify command checks your cassette save to make sure they're good. You can save all or any part of the text buffer to cassette and you can append pre-existing files from those you have in the buffer already.

### ASCII COMPATIBLE

Telewriter turns your DRAGON 32 into the most powerful, lowest cost, word processor in the world today. But that's not all. The simple ASCII conversion program provided with Telewriter means you can use the full power of the Telewriter editor for creating and editing BASIC and assembly language programs. It means you can use Telewriter to prepare or edit text files used with any data communications program.

Telewriter costs \$49.95 on cassette and is

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## No Spectrum upgrades

SUNCLAIR Research has not yet begun to offer RAM upgrades for current 1MHz Spectrum or BBC machines.

Even since the Spectrum was first advertised in June last year the company has prioritised the upgrade. "The problem is just how to do the modification," said a Sinclair spokesman, "but how one makes the upgrade available."

"We plan to make the service available in sections of 1MHz purchase, early and in sequence," he said.

Apparently the upgrades will begin "in a matter of a very few weeks," at a cost of £60 which includes parts, labour and all postal charges.

## Monopoly no more

FARBER Brothers has lost its battle to keep its US trademark in the Monopoly board game (see Popular Computing Weekly, February 24).

The US Supreme Court last month upheld an earlier California appeal court decision that the word "Monopoly" had become a "commonly descriptive name for real estate board games." The court ruled that Farber Brothers was therefore no longer entitled to the trademark it has held since 1935.

## Peanut power

*(Continued from page 1)*

of 280 x 192 pixels — colour resolution in this mode is 140 x 192 pixels. Both upper and lower case characters are printable.

The basic Peanut costs £299 plus VAT. Other Prices (£100 discount of VAT) are disc drive card, £27.95; 128K card, £16.95; Continuous interface, £19.75; and BASIC, £18.25. Language cards and an 80-column card also cost around £100. A disc drive is also available — cost under £200.

"The Peanut is priced very reasonably," commented Mr Roberts. "It seems so then one should ask why the Apple is so expensive."

The Peanut Computer will be available from the middle of April by mailorder only from Peanut Computers, Dowsbury, West Yorkshire.

## CTA to investigate lending libraries



CTA chairman Tony Drew (standing left) and secretary Nigel Gouraud (seated right).

*(Continued from page 1)*  
to investigate questions of copyright and software licensing.

The CTA is to develop a standard warning against unauthorised use of software. A watchdog will monitor the activities of lending libraries.

It was suggested that the CTA might follow this with an action to fight a test case.

Membership of the CTA now includes Atari, Tandy, Computer, Big Blue, Silverstone, Gemini, Virgin Games, Oxford Computer Publishing, Logiktron, Microsway and

### Better Micro Shop

The next meeting, to be held in London on Tuesday, March 29, at 11 am (no time yet to book), will consider the draft constitution and the code of practice. Details from Nigel Backhouse (Tel: 0895 37625).

## Apple fights to ban cheap imitations

APPLE is continuing its campaign to stop the import and sale in the US of what it claims are low-cost Apple III look-alikes — so-called "knock-offs".

The company has persuaded the US International Trade Commission to look into alleged infringements of Apple's patents and copyrights on machines produced in the Far East — Hong Kong, Taiwan and Singapore.

This move follows Apple's earlier, unsuccessful, attempt to take legal action in Taiwan against two companies — Systech Computer Services and Golden Phoenix. The actions were dismissed by the Taipei court on a technicality. Apple claimed infringement of copy-right in the Apple II Plus.

Apple III "knock-offs" on sale in the US and Europe can be bought for less than half the cost of the original machine.

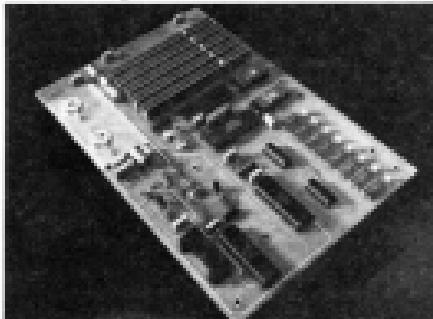
## Price unchanged

TEXAS Instruments' 250 pixel diagonal monitor scheme for the TI 99/4A home computer has been so successful that the offer is to be continued indefinitely.

"The major reason the TI 99/4A machine was not selling was price," said Michael Lynch, TI (UK)'s managing director.

The TI994A now sells for between £149.95 and £159.95.

## Build your own micro



A 68091-based computer board is being manufactured by Adaptec (Engineering). All that is needed to turn it into a powerful computer is a keyboard and a monitor.

The board includes 64K RAM, its 1MHz on-board timer, a processor board, 68090 assembly language and 1991 Basic editor. Keyboard input is standard ASCII — output to a black-and-white television or RGB colour monitor is possible. A colour encoder board, which decodes the colour and upper and lower case font set with an ordinary colour TV, is available as an option.

Interfaces include a 1,000 baud cassette port and five ROMP buffer ports. These latter can be used to connect serial, parallel or serial I/O ports, up to 2M of additional memory, or a sound board.

The central CPU board will sell for £195. The keyboard is priced at £180, the main adapter is £18.75 and the colour encoder board (available late April) is £50. The disc interface and operating system — Flex 99 — a free format system (enabling individual disc operating systems to be supported) — will run from up to eight double-sided double density drives — is £120. Serial and parallel interfaces are scheduled for May.

Memory expansion options include a 544K unit with 280 second processor to run CP/M for £90 or a 1.28K board for £160 which can be simply expanded (only the chips are required) to 256.

More details from Adaptec (Engineering), 94 Totnes Hambles Road, Forest Gate, London E7.

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ORIC-1 16K RAM	1	£199.95	£199.95
One Communications Magazine	1	£7.50	£7.50
One Owner Magazine (6 monthly)	1	£15.00	£15.00
Postage and packing	1	£1.00	£1.00
			£216.90

# LETTERS

## Machine code Instructions.

I noticed in this week's *Personal Computing Weekly* (January 29-30), in the Frees & Fails column, a question about three Z80 machine code instructions: 'ld (l), l' (l), 'ld (h), l' and 'ld (a), l'.  
The section on 'instructions that input into a register, using the V register as the port address' is well documented in the Z80 assembly language manual. They have the side effect of setting the flags to

show the status of the data type read in — whether it is zero, positive, etc.

The 'ld (l), l' instruction is not well documented in the assembly manual (and I believe it is not available in Zilog's own assembler), but the corresponding machine code is in the Z80 hardware manual, so I felt justified in listing it as a standard Z80 instruction: it is part of the specification of the Z80 chip. It is often used to set the flags, in the same way as for the other seven instructions, but there is then no way the data type itself without setting it anywhere.

The 'ld (h), l' and 'ld (a), l' instructions derive from the way the Z80 was designed to be 8-bit compatible with the Intel 8080. Both instructions are available, unexpanded, on the 8080, and so they had to be available on the Z80 as well. However, the Z80 also includes the non-8080 instructions 'ld (p), l', 'ld (h), l', 'ld (a), l', 'ld (c), l' and so on, all prefixed. It seems that it was easier to include a second, redundant, version of 'ld (l), l' and 'ld (a), l' in the set.

Steve Vickers  
22 Fincham Street  
Sutton Hill

Cambridge

For those of you who don't know, Steve Vickers wrote the Spectrum manual. He also de-

Andrea Prentiss  
M1 Surrey Road  
Chilham  
Kent

## Software libraries defended

On the subject of software libraries, we believe that your readers will find the following of interest to them.

Part of our business at Cottenham Computers is the running of such a library dedicated to the Dragon microcomputer. It is our policy to approach software suppliers suggesting that a financial agreement be reached to enable us to have out their programs. So far, we have reached agreement with 70 percent of the software suppliers who have responded to our initial contact. The majority of suppliers who do not agree to the like of their software are however basic to the sale of their software to proceed.

Therefore, at present our library has a possible content of approximately 70 different software titles. We are also

able to offer for sale at special prices 90 plus pieces of software for the Dragon. Members thus have the opportunity of sampling a majority of software before contemplating purchase.

As previously announced the position is changing weekly as additional suppliers make contact and as new software is released.

I hope the above facts help to allay the fears of any Dragon owners concerned that they might join a library only to find it held through lack of software — but please inquire as to whether agreements have been made with software suppliers.

David and Susan Thompson  
Cottenham Computers  
Park Hall  
Bland Norton  
Oxon

developed the Jupiter Ace, in conjunction with Richard Altmann.

## The missing link

In my piece on machine-loading the Spectrum — page 22 of your February 1981 issue — a number has gone missing in the data for the first machine-code routine. Line 59 should read:

LD A,(T) LDH A,(T) LDH A,(T) LDH A,(T)  
LD A,(T) LDH A,(T) LDH A,(T) LDH A,(T)

to with an extra 32 after 62 in the second line. Also, less obviously, the mysterious instruction

LD A,E

in the disassembled listing of the second routine should read:

LD A,E, RNN

Geoff Wicks  
24 Fernside Road  
Handsworth  
Birmingham B21 8EG

"Title", but does not find it.

3) When recording a second program record the tape fully and type in Step "Title of program", switch on recorder and press enter. The tape will wind-on and stop just past the first program — start recording the second program at this point. Do not leave too large a space between programs, as the Dragon loses the loss of the blank tape, and the recorder motor variable, and records with an FO error.

4) If the above points fail, try removing the jackplug to ear socket when recording and reinserting the jackplug to ear socket when playing back, as sometimes a local loop is formed and corrupts the data.

B Jones  
19 Cray Park  
Stourton  
South  
West Glamorgan

## Compiling the errors

A few errors crept into my A1 compiler program printed in the 24 February-March issue of your magazine. I have listed the corrections below:

LINE 27 ... PRINT Q;  
LINE 30 ... PRINT Q; AND  
PRINT Q; Q is a  
label  
LINE 40 ... PRINT P; T is a  
label  
LINE 41 ... AND P=1024

Also I would be grateful if you would publish the fact that my first name is Richard, not Robin as printed.

Richard Wright  
24 New Road  
Knaresborough HG5 8JS

## Undeserving astrologers

In this scientific and so-called "enlightened" age, I find the supply of astrology software as the ultimate insult to human intelligence. It makes me wonder whether or not we deserve the technology we run.

Perhaps, it is fortunate that computers cannot yet think!

T P Evans  
33 Malvern Place  
Buntingford  
West Sussex

# Womp-Rat

A new game for ZX Spectrum by Derek Spring

In Womp-Rat, you are the son of a kindly moisture farmer. Your mission is to defend the farm from the hordes of thirsty Womp-Rats which are attacking it.

The Womp-Rats start from the top of the screen and move down towards your farm at the bottom. You are in the middle and can move left or right, firing your team lasers up at the Womp-Rats until they pass you. Then you can turn 180 degrees to fire down at the remainder. You can only turn once each row of Womp-Rats and the

number of rats increases with each successive wave.

The program was written to make use of Del Fn as a Left or Right key. Lines 10-180 set up the screen, the graphic characters and the string which contains the Womp-Rats. Lines 210-300 control the movement of the rats.

Lines 300-390 control your movement, and check to see if you are firing or turning. Lines 390-480 are your firing routine, while 400-430 check to see if you are out of the

limits of the screen. Lines 440-510 are the instructions, while 6000-6000 are data for the graphics characters.

The figures in lines 28-30 correspond to graphical character keys, all being used with Caps Shift except 7a and 8a. Lines 110, 180, 280, 380, 281, 381 contain the defined graphical characters.

The speed of the game can be changed in line 310 by altering the maximum value of G, but 5 seems best.





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### DRAGON OWNERS CLUB

The Dragon Dungeon Club inventory newsletter, "Dragon Fleet", is packed with news, reviews and information for the dedicated Dragon user. The March issue of "Dragon's Fleet", now out, includes both hardware and software offers and Club Members registering before March 31 will be eligible to purchase Dragon badges and souvenirs at very special prices.

Annual membership, including "Dragon's Fleet", £3 (one-month trial subscription £3.25).

## THE DRAGON DUNGEON

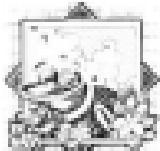
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## C★TECH SOFTWARE ZX Spectrum Software

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**CENTIPEDE AND PODGER** By the time you read this you may well be a Centipede expert! CENTIPEDE is a fast action game where you must race across the screen and eat all your enemies! Later you'll find yourself fighting against weirdly shaped centipedes that crawl over you and eat you alive! There are other new games planned for the future, so keep an eye on the software pages for all sorts of surprises ahead! PODGER is another fast action game, but this time you must race across the screen and eat all your enemies! PODGER is a simple and addictive game, but it can also prove to be very difficult to beat! Price £3.95.



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### FIGHTER PILOT /

### CITY BOMBER



**FIGHTER PILOT** is an impressive program for the ZX Spectrum. It begins with a training session giving details of the fire attack, waves and others who possess of the assault units include Missions school and practice. You have to get the survivors across the lines and shoot them down! There are two different versions, fighter pilot and a paratrooper sequence. It makes full use of all the screen colours, colour and sound!

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-----  
Please send me the following:

-----  
My name and address is:

-----  
Programme \_\_\_\_\_  
Enclosure \_\_\_\_\_

## Tomorrow's heroes

**David Kelly** talks to **Nick Alexander**, head of the newly-formed Virgin Games.

Computers are the latest arena into which media-magnate Richard Branson is nudging his Virgin Group of companies. Branson's decision to go for video games will add another facet to an empire that has a turnover of £250m and spans the record, film, book and video industries.

This new venture, called Virgin Games, has Popular Computing Weekly, February 26, is located in minuscule offices in London's Portland Place. Nick Alexander, boss of the new company, has only been in the job for five weeks, but already he has a clear idea of what he hopes to achieve: "We will work on similar lines to a record company, instead of having in-house programmers, we will build up a roster of successful freelancers, using Virgin's substantial resources to promote them."

The record industry is something Nick is familiar with. After leaving college, he worked for EMI records marketing such bands as Angelic Upstarts and Denny Straylight Runners.

After becoming Marketing Manager for HMV Record Stores, he got his first taste of computers when he was appointed to mastermind Thorn EMI's push into the video games market.

"All credit to a chap at Thorn EMI called Bryan Turner. He saw the potential in video games five years ago and he steadily built up a number of titles. When I joined all the titles were already there. What I was so pleased about, particularly as I had to market them, was that the software was original — we didn't have Space Invaders and Pac-Man spoofs."

"What I did was to take all the programs available and put them out. Rather than just releasing five or six, we wanted to make a big impact. We didn't expect all the titles to sell well — we recognised that there were some weaker programs. The problem really for Thorn was that all the material had been produced in a vacuum — they had never been in video games before."

### Virgin birth

Towards the end of last year the managing director of Virgin's record chain left to go to a video company. And, largely because of Nick's earlier success in getting the HMV record stores a facelift, Richard Branson approached him to see if he would be interested in the job. "I said that I felt the video games market was more interesting. Richard said it was something he had been looking at too, so the idea of Virgin Games was born — it was really a series of coincidences."

"At the moment what we are looking for is existing programs to put out. Already I



have been sent some material that is quite remarkable — there are people writing some very different kinds of games."

Nick is keen that Virgin Games should not get involved in doing versions of established arcade games for home computers — he feels this is a destructive approach. Virgin will operate as a marketing and distribution centre. The emphasis will be on individuals.

"I'm looking for a pool of freelance machine-code programmers who have some material so we can start to build their name. With some of the smaller companies, an off-credit line organisation, but it is much harder to market a software house than an individual in a way to catch the imagination of the public."

"I am sure that it is an almost inevitable part of the way the market will build up that there will be 'video stars'."

"I strongly believe that Another Time from Virgin Games is less interesting than Another Time from Joe Strummer."

"We should have the first game out at the beginning of June — this gives us plenty of time to get our distribution sorted and before Christmas. I would like to see us put out 30 titles this year. It is unlikely that we will offer the same game on more than one machine at the beginning — I would dearly love to pick up titles that we could launch simultaneously on more than one machine but, for a program in machine-code, that is not so easy. Besides, different sorts of people buy different computers. The sort of game that would be a sure-fire success on the Amstrad need not necessarily do well on the BBC."

The new company is interested in software for any machine, currently available. If the Orci can be produced in quantity, then Virgin will do material for that too. "The Orci could be like the Dragon 3D, but with virtually no software back-up. I think that situation is changing though — as the market broadens, attention will switch from the hardware to the software."

The software market is still growing at a phenomenal rate. Nick points to market research which shows that 90 percent of those who buy a computer do so to learn to

program. Six months later only 10 percent have done so. The rest are playing games.

To begin with, Virgin software will be cassette based. "We will keep an open mind — I have no fixed and fast thinking for the format for our software. I can't see any rush to get into ROM for example — and I think people are happy to pay a bit less for their games. The only advantage was for piracy reasons, cartridges being more difficult to copy, but I have recently discovered that it is comparatively easy to pirate ROMs. In the US there are now ways of easily down-loading ROMs into a sort of EEPROM. As far as I'm concerned, cartridge software has lost its attraction."

"Presentation is one of Virgin's strengths, and our packaging will be innovative. We also have to try to discourage people from bypassing a friend's copy of one of our cassettes. Home taping is an enormous danger. We have seen the videotape business almost destroyed over the last two years."

### No incentive

Even now 75 to 80 percent of the video market is illegal material. If that was to happen to the software market, Nick reckons the supply of new games would just dry up — there would be no incentive.

Nick sees the new Virgin Games subsidiary as being ideally placed in the market. "We have the resources to put behind a product to market it for all its worth and to put it out to as wide an audience as possible. I see our immediate competition as companies like Quicksilver and Big Blue rather than Atari and Thomson. And with the resources within Virgin, we can sell more copies of a given program than they would be able to."

As for Virgin, the parent company is obviously taking the venture seriously. "Richard is aware that the record industry is not going to continue to grow at the rate it has done. He is mindful that video games could be one future for Virgin."

"The real heroes of tomorrow could be the computer programmers, not the musicians. Rather than programmers putting on sequenced suits, maybe we will have to redefine what a super-star looks like!" ■

### **A word or two in your ear**

**Keith and Steven Bratton take a close look at Telemixter – a Dragon word-processor.**

#### **One of the advantages of the tool**

Other design of the Dragon is that numerous programs have already been developed in the LSI for the Tandy Color Computer, although certain differences in the PMS mean that some programs are not directly interchangeable. Without doubt one of the most impressive programs produced for the Tandy Color Computer is a word-processing package known as Telewriter. A new version of this program, specially modified for the Dragon, has now been launched in the UK by Microdata. At £120 it must be the most inexpensive Dragon program on offer, so what exactly does it do and can any software bought in another of the rest of the computer stores be used with the rest of the computer? If so, why?

The basic function of a word-processor is to create and store text in a computer in such a form that it can easily be edited, formatted and printed. Word-processing is rapidly becoming the norm in the business world, but trying to explain the value of word-processing to those who have never used it is like the old Bob Newhart sketch where he plays Dr Walter Kangaroo trying to explain kangaroos to the court of Queen Elizabeth the First. While word-processing is every bit as vital to many as breathing, the odds are one probably wouldn't be expected and perhaps not even willing to write without a keyboard and virus.

In essence, a word-processor replaces "rough drafts," notes on scrap paper or backs of envelopes, and repeated rewriting of commonly-used text. It enables you to type out your first thoughts and then easily modify them as your ideas change, before finally arranging them on the page in the most suitable way and printing them out. A standard office package like Wordstar costs around \$250 and runs on a \$2,000 machine.

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Teacher comes on cassette and consists of a machine code file, which is loaded by Cibusoft in less than a minute, and started by EASY. The cassette contains four versions of the program, but these only differ in that they are configured for different printers. It also contains a demonstration test program and the Content program. The programs are repeated on the reverse side. In addition the package includes comprehensive documentation comprising the Reference Tutorial, Reference Manual and Moving Mass Processor and Input Devices.

The tutorial starts from scratch and assumes no previous knowledge of programming or word-processing. It provides a step-by-step introduction to the various features of ResEdit in a very well-presented, accurate and understandable form. The extensive numbered cross-references

of the same ground, but in a more ordered format, and thus is comprehensive index and a useful command summary table. Although the program was originally written as a word-processor, it can also be used as an extended editor for Basic programs with the aid of Connect.

The only little complaint about the documentation is that the explanations for the Dragon version were obviously done with good old-fashioned Topaz, rather than Tealwriter (apparently because the only copy of the book was on their non-compatible Twenty-line version, and it's £65).

When *Printerem* is executed, a copyright notice appears. Pressing Enter adds to the menu menu, where the available commands appear in inverse video. These are Create, Edit, Save, & Save As, Read In, Append, Verify, Format and Words. The menu menu also gives the name of the last read-in and the amount of space remaining for text. At start-up space is a very reasonable 14,683 characters (about 14 MB pages), which compares well with about 2,000 in Microsoft's *Word*.

Pressing the appropriate key (first letter of word) carries out your command. Create and Alter are the only commands which destroy the material already in the text buffer, and they are carefully trap-hopped, requiring upper case confirmation of your intentions before being acted on. Del adds to the text currently in the buffer, returning you to your last position in the text.

The **Save** command requests a filename and then translates the whole file to cassette. As files are stored as machine code, translate is much faster than with other low-cost systems which use ASCII dumps. The useful % Save feature (coded as %1) allows you to save individual parts of a file, while Append allows you to add

A black and white portrait of a man with a beard and glasses, wearing a dark sweater over a collared shirt.

another life lesson taught by their best example in the Father (every created life dealing with "separation" from and the resulting consequences).

Verify checks that your test has been saved successfully, before you delete your file, and is an essential part of any serious test-processors. As the programs contains a useful Auto-retry mechanism, it does not crash if you start to playback in the middle of a test so re-verifying the file at the start doesn't take it off unnecessary.

**Calling Pages** displays the number of words and lines in the current file. The final command is **Format**, which takes you to the second (format) menu which is concerned with accessories such as colors.

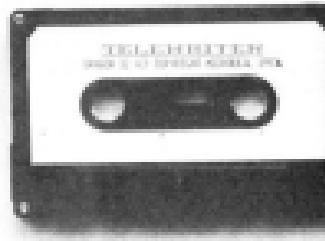
When you press "C" to create your first file, the screen clears to black. A black L-shaped cursor remains in the top-left-most corner used to a small black square, which marks the end of the file.

Instead of the normal very limited 32 columns by 16 lines display of the Dragon, with inverse graphics to represent lowercase, a much more useful 64 columns by 16 lines display with true lowercase, uppercase, numbers and symbols.

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out doubt this feature alone puts Teletexter ahead of any of other word-processing programs for the Dragon that we have seen. The display is quite clear, but looks even better if you turn down the colour (try your best to give black and white printouts, which we were using while writing this review; the picture was crystal clear). Shift-**G** switches between upper and lower-case, but holding shift down in lower-case mode also produces upper case, all at a normal typeface.

#### Shortcuts ahead

If you continue to type, Teletext will scroll when you exceed 80 columns, so that words do not break. Text is always inserted at the current cursor position, which can be moved one character or line in the appropriate direction with the four arrow keys. If shift is held down at the same time as a cursor key, auto-repeat enables you to move faster through the file, and across the screen if the top or bottom is reached.

The Clear key is redefined as a Control key (that is special functions are assigned to other keys if they are pressed at the same time as Clear). For example, Clear and the arrow keys will move you to the top or bottom of the file, or the start or end of a line, while Clear Pages goes forward, and Clear – pages you backtracks through the file. A character to the right of the cursor is deleted by backspace, or a whole line may be killed with Clear R.

#### Global search and replace

When you insert additional text into an existing line, overline may occur so a continuation line below the current one, but the text can be simply resigned with Clear A. No horizontal scroll scroll is provided, but this is not really necessary when you already have 80 (plus 32 characters) on a line. If you are entering columns of figures, you will find the Clear T function useful.

If block markers are placed at the beginning (**Clear B**) and end (**Clear E**) of a section, Clear C will produce a Block Copy at the current cursor position. If only the end marker is placed, then Clear F will cause a Block Delete from the current cursor position to the end marker. Block Moves are achieved by combining Block Copy and Block Delete.



Another very useful control function is Clear G for Global Search and Replace, which will search the text for any pattern of characters, which you define, and then allow you to automatically replace them. Clear H gives replacement and Clear M

that point. Format Codes can change any of the normal parameters to give underlined, superscript or emphasized text, etc, while New Page automatically moves the pointer on to the top of the next page. Commenting of lines is supported and a Header/heading can be printed at the top of every page. Finally, use of *Direct* lines at the start of a file means that special control codes (up to 16 characters long) can easily be inserted anywhere in the text.

Basic programs saved in the normal manner are not compatible with Teletext, so conversion is needed. To get Basic into the correct form, you first need to save the program as a .BAS ASCII dump by 'Save As Name...A'. The Convert program on the Microdot tape is then loaded and the Ascii dump read in and converted to a new machine-code file which is compatible with Teletext. Convert and BASIC is in the complete collection, to make BASIC-compatible Ascii dumps of programs written within Teletext.

This method enables you to have a full screen editor which has all the functions of a line swap, replace and copy which you would have included in the normal Dragon editor. You can also use it to merge programs via Append or to include actual program lines in documentation. Although you can write Basic in Teletext, you have to be a little careful about entering all your lines correctly. And, as you cannot run the program within Teletext, you will have to finally debug it later.

The only things obviously missing from Teletext are justification (alignment) of the right-hand margin, so that the output appears typed rather than in true printed form, and an on-screen word, line and page status display. If these particular features are of overriding importance, then you must look elsewhere, but you are going to have to do without a lot of other important features if you opt for one of the other Dragon word-processing packages.

#### Conclusion

Teletext is undoubtedly a 'real' word-processor which provides an excellent tool for the serious Dragon user. It is suitable for the small business, or the professional writer, as well as taking care of most word-processing chores if you can't imagine a home word-processing choice you should switch these kids hopping to let them to use it for their English homework. We are used to Wordstar on a Superbrain, but have not noticed that much practical capability has been lost in coming down to this level. The price may look steep at first, but you really must compare it with something like the Microdot Reporter for the Vic20, which at £125 for fewer facilities no longer looks much of a bargain. Also, a disk version is under development for those who require greater storage capacity and more rapid access to records.

Teletext is a highly recommended package which demonstrates the potential of the Dragon as a serious machine.



## OPEN FORUM

**Open Forum** is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the **Program of the Week** double our new fee of \$8 for each program published.

**Strikers Revenue**

iii

This original game takes place outside a factory. Unfortunately two of your enemies are standing on the roof throwing "things" at you. You must break a window to get the skilled job of catching the dropped items and throw them back to the window breakers.

#### REFERENCES AND NOTES

You must have more back and catch more — BUT, there are only two minutes to grab as many as possible and you are only allowed to drop five things. If you manage to catch twenty you can get your revenge (on the workers) by firing them.

It is not an easy job if it sounds — so who will try it? Management instructions and all the decisions. However, there is no need and

10

- 100 Sync variables
- 200 User-defined graphics
- 300 Screen display
- 300-300 Decides which of Beamer's slides will show.
- 300-300 Places the "Beamer" logo on the screen.
- 300-300 Checks if slide is part of a search.
- 300-300 Checks keyboard, problems
- 300-300 Displays slides
- 300-300 Caught objects
- 300-300

www.ijerph.com

Main variables:  
 M = Tabulation for printing men.  
 MS = Senses for printing the men.  
 LOS,LISI = Various lary strings.  
 PO = Position of object.  
 D = Amount of objects dropped.  
 S = Success.

**Streets Home**  
The Street Channel

#### Lunar Landscapes

Page 12

The program as listed is for use with a joystick. To change the program for use with

The UP/LEFT/RIGHT arrows keep the  
change.

www.wiley.com - Books from

Change instructions from line 1000 onwards to use the arrowed keys and the space bar to turn off engines. The Reset function applies here too because we've

1. **What is the primary purpose of the study?**  
The primary purpose of the study is to evaluate the effectiveness of a new treatment for depression compared to a placebo. The study will also assess the safety and side effects of the treatment.

2. **Who is eligible to participate in the study?**  
Eligible participants include adults aged 18-65 years old who have been diagnosed with major depressive disorder. Participants must be willing to commit to a minimum of 12 weeks of treatment and follow-up visits.

3. **What are the inclusion and exclusion criteria?**  
Inclusion criteria: Major depressive disorder diagnosis, age 18-65, willing to commit to treatment. Exclusion criteria: History of suicidal behavior, current substance abuse, pregnancy or lactation, and certain medical conditions.

4. **How many participants are needed for the study?**  
The study aims to recruit approximately 300 participants across four sites.

5. **What are the study procedures?**  
Participants will be randomly assigned to receive either the new treatment or a placebo. Both groups will receive 12 weeks of treatment. At baseline and weekly intervals, participants will undergo assessments of symptoms, functioning, and side effects. After 12 weeks, participants will undergo a final assessment and may choose to continue treatment or discontinue.

6. **What are the potential risks and benefits of participating in the study?**  
Benefits: Access to a new treatment for depression, potential reduction in symptoms, and contribution to scientific knowledge. Risks: Side effects of the treatment, including nausea, drowsiness, and changes in mood. Discontinuation of treatment if side effects are severe.

7. **How will participant privacy be protected?**  
Participant information will be kept confidential and stored securely. Data analysis will be conducted using de-identified information.

8. **What are the costs associated with participation?**  
There is no cost to participate in the study.

9. **How can I learn more about the study?**  
Contact the study team at [Study Team Contact Information].

— 1 —





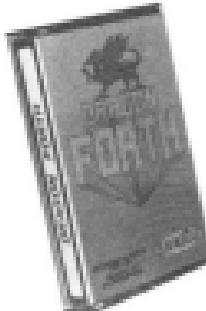


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Campbell Systems, Dept. 1001,  
15, Rose Road, Ryedale Hill,  
Exeter, EX3 5BL, England.  
Telephone: 01-504 2669



## FORTH FOR THE DRAGON 32

DRAGONFORTH is an implementation of Pig-FORTH for the DRAGON 32 microcomputer but with a difference.

As well as the enormous power of the FORTH language, DRAGONFORTH can also execute BASIC statements. This combines the superb DRAGON sound, graphics and Floating Point commands with the tremendous power of FORTH to produce an unparalleled hybrid. You can write a whole program in BASIC or a whole program in FORTH or any mixture of both.

If not already convinced send £2.50 for the 80-page manual (cheques/money orders first class).

DRAGONFORTH is professionally packaged, securely packed, guaranteed for life and will be despatched by return complete with free demonstration graphics program.

AUTHORS: OASIS Software will market high-quality programs you write in DRAGONFORTH. We pay a license fee to accommodate and a generous royalty. Let's hear from you! OASIS SOFTWARE, LOWER NORTH STREET, CHEDDAR, SOMERSET. Telephone 0804 515265.



24 HOUR SERVICE  
TAKES UP TO 24 HOURS  
24 HOURS A DAY



1 / 1

On the other hand, the results of the present study indicate that the mean number of days required for the onset of symptoms following the first dose of the vaccine was 1.5 days, which is shorter than the 3-4 days reported by others. The mean age of the patients in our study was 11.5 years, which is also younger than the 15-18 years reported by others. The mean age of the patients in our study was 11.5 years, which is also younger than the 15-18 years reported by others. The mean age of the patients in our study was 11.5 years, which is also younger than the 15-18 years reported by others.

REVIEW OF THE LITERATURE  
AND THE STATE OF KNOWLEDGE  
ABOUT THE EFFECTIVENESS  
OF THE VARIOUS TYPES OF  
THERAPY FOR ADDICTION  
TO DRUGS AND ALCOHOL  
IN THE TREATMENT OF  
MENTAL DISORDERS

Sparkle

卷之三

This program is designed to work on a Dragon 32. It uses the standard graphics characters available on the Dragon to give an impressive kaleidoscopic effect using most of the available colour set when using the text screen.

The program gives an endless display of additional mathematical contexts.

### **What's next?**

10 Circular Economy

L= Length of one line on the screen.  
G= First number of projection intervals

Digitized by srujanika@gmail.com

- 10. Client screen sets resolution.
- 11. Selects random graphics and random colors.
- 12. Changes direction of display.
- 13-17. Displays full graphics screen.
- 18. Returns to client read pattern.

- 1. Read Graphics A
- 2. CLE
- 3.  $A_1 = 255$   $D_1 = 255$
- 4.  $A_2 = 255$   $D_2 = 255$
- 5.  $A_3 = 255$   $D_3 = 255$   $M = 255$   $C = 255$

```

4) PULL -> TTY1 AB --- PULL -> TTY1
T AB -> CDEFGHIJKM -> S -> PULL -> TTY1
    MEET
5) PULL -> S, MEET
6) S
7) P -> S C -> E, B D -> EFGHIJKM -> S, F -> E
8) FOR S = PULL STEP D
9) FOR S = EFGHIJKM
10) FOR S = F
11) PULL -> S, MEET
12) PULL -> S, MEET
13) PULL -> S, MEET
14) PULL -> S, MEET
15) PULL -> S, MEET
16) PULL -> S, MEET
17) MEET MEET

```

Int'l Trade

Word

2020

The World is for 2008 with Rampsack. It is quite straightforward to input and can be printed on the 2008 Planner pages. Consider the

Changing the Prior statements to 1 point  
The map requires 20 lines of the display  
so Full Map (before 3 lines) can be used to  
allow as many points as needed.

Readers may wish to try sending their entries to the left address shown above.

machine code methods. Spectrum authors can experiment with values to show the different experiments and perhaps use a few techniques and their flow rates.

A competition could easily be based on these items.



THE USES OF

The World  
Bank

## OPEN FORUM

100

© Beamer

In this game you are given 3 ships and have 30 minutes to fire. The deadly shark will come after the screen, gradually

moving down, while dropping revenue balloons on you from time to time. The game ends when you either run out of resources, lose all your ships, or the shark gets to the top bar and gobble you up.

At the end of the year you can present

public comment on your rules.

Digitized by srujanika@gmail.com

The program begins with *Point* and *Target*. The user is prompted to enter the two points, using P1, P2, A1 and B1 as the variables that define the object, or the position of the lines.

**Jerry**  
by Jerry Sorenson

### **Find the Crack**

DE 5000

Your task is to identify a wanted criminal hiding among a crowd using your knowledge.

reward of \$17,500 is given for your help. But you must act quickly as the reward decreases with time.

**WARNING:** Do not shoot an innocent person.

10-10	Disturbance gradient
20-20	Blurred level of difficulty
30-30	Institutional planning (influence, time etc.)
40-40	Short loop (reading materials, monitoring, time etc.)
50-50	Planning

3 PERIOD 2 (CONTINUED) DURATION 11:00 TO 12:00  
4 12:00-12:15: 10' 30" (approx 10' 30")  
5 12:15-12:30: 15' 00"  
6 12:30-12:45: 15' 00"  
7 12:45-12:55: 10' 00"  
8 12:55-13:00: 5' 00"  
9 13:00-13:10: 10' 00"  
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14 13:50-13:55: 5' 00"  
15 13:55-14:00: 5' 00"  
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29 15:55-16:00: 5' 00"  
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31 16:10-16:20: 10' 00"  
32 16:20-16:30: 10' 00"  
33 16:30-16:40: 10' 00"  
34 16:40-16:50: 10' 00"  
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71 21:55-22:00: 5' 00"  
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419 71:40-71:50: 10' 00"  
420 71:50-71:55: 5' 00"  
421 71:55-72:00: 5' 00"  
422 72:00-72:10: 10' 00"  
423 72:10-72:20: 10' 00"  
424 72:20-72:30: 10' 00"  
425 72:30-72:40: 10' 00"  
426 72:40-72:50: 10' 00"  
427 72:50-72:55: 5' 00"  
428 72:55-73:00: 5' 00"  
429 73:00-73:10: 10' 00"  
430 73:10-73:20: 10' 00"  
431 73:20-73:30: 10' 00"  
432 73:30-73:40: 10' 00"  
433 73:40-73:50: 10' 00"  
434 73:50-73:55: 5' 00"  
435 73:55-74:00: 5' 00"  
436 74:00-74:10: 10' 00"  
437 74:10-74:20: 10' 00"  
438 74:20-74:30: 10' 00"  
439 74:30-74:40: 10' 00"  
440 74:40-74:50: 10' 00"  
441 74:50-74:55: 5' 00"  
442 74:55-75:00: 5' 00"  
443 75:00-75:10: 10' 00"  
444 75:10-75:20: 10' 00"  
445 75:20-75:30: 10' 00"  
446 75:30-75:40: 10' 00"  
447 75:40-75:50: 10' 00"  
448 75:50-75:55: 5' 00"  
449 75:55-76:00: 5' 00"  
450 76:00-76:10: 10' 00"  
451 76:10-76:20: 10' 00"  
452 76:20-76:30: 10' 00"  
453 76:30-76:40: 10' 00"  
454 76:40-76:50: 10' 00"  
455 76:50-76:55: 5' 00"  
456 76:55-77:00: 5' 00"  
457 77:00-77:10: 10' 00"  
458 77:10-77:20: 10' 00"  
459 77:20-77:30: 10' 00"  
460 77:30-77:40: 10' 00"  
461 77:40-77:50: 10' 00"  
462 77:50-77:55: 5' 00"  
463 77:55-78:00: 5' 00"  
464 78:00-78:10: 10' 00"  
465 78:10-78:20: 10' 00"  
466 78:20-78:30: 10' 00"  
467 78:30-78:40: 10' 00"  
468 78:40-78:50: 10' 00"  
469 78:50-78:55: 5' 00"  
470 78:55-79:00: 5' 00"  
471 79:00-79:10: 10' 00"  
472 79:10-79:20: 10' 00"  
473 79:20-79:30: 10' 00"  
474 79:30-79:40: 10' 00"  
475 79:40-79:50: 10' 00"  
476 79:50-79:55: 5' 00"  
477 79:55-80:00: 5' 00"  
478 80:00-80:10: 10' 00"  
479 80:10-80:20: 10' 00"  
480 80:20-80:30: 10' 00"  
481 80:30-80:40: 10' 00"  
482 80:40-80:50: 10' 00"  
483 80:50-80:55: 5' 00"  
484 80:55-81:00: 5' 00"  
485 81:00-81:10: 10' 00"  
486 81:10-81:20: 10' 00"<br

110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 229 230 231 232 233 234 235 236 237 238 239 239 240



---

**OPEN FORUM**

Page 11

Pencill

四六文獻

This program was independently created by Popular Computing Weekly, February 24 — March 2, 1981 as a contribution.

4. HOME TEAM, HOME TEAM  
HOME TEAM, HOME TEAM  
HOME TEAM, HOME TEAM

routine which can multiply two 14 digit numbers accurately, rather than sounding

The task was complicated because no functions such as  $\pi$  could be applied to numbers greater than eight figures, and then would be rounded off. The results

**Find the Creek**  
by Suzanne Hines

as to hold the relevant numbers in strings, together with single variables set to the same length as the appropriate strings. This program, for a Z8001, can be Run in Picot, but this will prevent you from saving the computer active at the time it did not.

1920-1921  
1921-1922  
1922-1923  
1923-1924  
1924-1925

• LQDQ MULTIMEDIA [2004] •  
SISTEMI MULTIMEDIALE  
LTDQ, TECNOLOGIE E SUPPORTO INFORMATICO  
LTDQ TECNOLOGIE E SUPPORTO INFORMATICO  
LTDQ P. 1 DI 200

• LINEA PANTHERA DUE •  
PANTHERA DUE  
PANTHERA DUE

Pencil  
by W. Gause

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During the last few months the standard of games software has continued to rise. Games enthusiasts all over the world are constantly seeking new challenges and now only the highest quality programmes can satisfy their demands. As more and more people acquire computers,

an ever increasing number find they have a flair for programming. Furthermore, established programmers are discovering that their skills are needed as much in this market as in the recognised business field.

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that 'something extra' which can turn an ordinary programme into an internationally famous one, please write to us, enclosing as many demonstration tapes as you like, so that we can give you our opinion and let you know what we have to offer.

Ascender Software, 38 Richmond Rd., London N11 2DR

## Tony Bridge's Adventure Corner



### All you need is love

Last week I reviewed *The Hobbit*, an adventure for the Spectrum from Melbourne House. This week, let's have a look at *The ZX81*, a machine that refuses to lay down and be manipulated by its flaccidling, the Spectrum.

*The ZX81* is ideally suited to feel adventure — although many programs now include graphics, with varying degrees of success. In the future, I will be looking at adventures that I think succeed in one way or another.

For the moment, though, a little paper Person, of Brighton, recently released an adventure called *Love*. The protagonist is a fairly ordinary adventurer, with the computer recognising some 200 words. But it differs from other adventures in two important ways. First of all, the protagonist is understood to be female, and second, the computer responds to emotional words such as kiss, cry, and so on, rather than the more conventional, active commands like back, up, or open.

The authors, apparently, are female. Ms. Miller and Ms. McMillan have written an adventure of which most females would not approve. The whole atmosphere is charged with the helplessness of the poor female heroine, who can only respond to a situation by quivering or becoming coquettish. I found that even a command to "strip naked" (yes, I'm afraid, in a manner of speaking), and frustration, was taken seriously by the computer. In this case the rest of the adventure was undertaken in the nude.

This is all fairly amusing, I suppose, but I wonder if it is doing anything any good. The original idea of adventure programs is a quest for gold or similar treasure, not some kind of groping march through a gauntlet of lechers with unlikely-sounding names. In *Carroll Software's Black Crystal*, to use an example, the player may specify his/her sex at the start of the game, and the computer will endow the traditional kind of program with the appropriate sex. I think that this is what should be aimed for if sex is to be brought into adventure programs.

Parsonoff's cynical approach, however,

though it may have seemed at the time of writing, is surely not going to entice its products to many people. If you think I am being too serious about all this, please let me know!

Enough from the pulpit. As I said last week, I hope to be hearing from you with your thoughts on computer adventuring, as well as your own reviews of favourite programs. Do not hesitate to write in — I can only look at a small part of the total output of all the software houses.

To finish with, here is a location that you might try to include in your own adventure (it might even appear in PCW's adventure).

The player enters a room, in the middle of which stands a large stone tree. A deep stream runs through the room, and on the far side of the trees three doors.

On the tree hang three candles, which burn with an eerie bluishgreen flame. If the top candle is extinguished, the resulting smoke blinds the player (providing, of course, they are not elsewhere in the location).

The smoke from the middle candle allows the player to hear the stream talking, and it may well tell the correct door to take (the other two doors of course lead him in greater trouble). The lowest candle explodes as the player attempts to snuff out the flame, and a strong Saxon appears to do battle with the poor player.

This location could, of course, be adapted, so that the candles will react in a random way. The player may also, for instance, jump into the stream upon being attacked by the Saxon, and be carried through a door (not necessarily the best one) by the water.

Let us have your ideas on adventure themes, monsters and so on, and remember: Always cast a blessing. "Grrr!"

**NB:** Entries are coming in thick and fast for the *Hobbit* competition (see *Popular Computing Monthly*, March 3-8, for details). The current leader is Peter Balla from Oxford who has completed 87.5 percent of the adventure.



This series of articles is designed for novice and experienced Adventurers alike. Each issue Tony Bridge will be looking at different Adventures and showing you some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, Popular Computing Monthly, FleetHouse Court, 18 Whitchurch Street, London WC1 7PF.

## Cruising Challenge

Get in  
Top 10

Find them all! Space Invaders, Bon Voyage, Zaxxon — now there is *Cruising*. This latest machine code, arcade type game, will test your powers of concentration to the limit. Never before has a game asked you to think so quickly... or react so fast.

Achieving a high score on *Cruising* takes considerable skill, and not a little practice. Getting through the first four levels is not easy, and that's just the beginning.

Now you can make that task work for you. *Popular Computing Monthly* is offering £10 each month to the player with the highest score on *Cruising*. All you have to do is enter this month's competition by sending a printout of your highest score, together with your name and address, to: *Popular Computing Monthly Cruising Challenge*, FleetHouse Court, 18 Whitchurch Street, London WC1 7PF.

Each month we will publish the name of the winner and the new cruising high score. Are you good enough to exceed the *Cruising Challenge*?

The highest score sent in so far this month is 460.3 from Julian Ossery of 1 Maple Close, Camberley. If you have a higher score, you could still win the monthly £10 — but hurry, entries close on March 14.



### Notes

- 1 Each entry must consist of a ZX printout and your name and address.
- 2 Closing date for the monthly *Cruising Challenge* is April 13.
- 3 The highest score each month will receive £10.
- 4 High scores cannot be transferred from one month to another.
- 5 The judges' decision is final.
- 6 For employment of *Popular Computing Monthly* readers, will be eligible to enter the *Cruising Challenge*.
- 7 *Cruising* can be obtained for the 1982 and 1983 ZX Spectrum in addition through Mr H. Smith and leading computer stores for just £4.95. It is also available elsewhere from *European Books Ltd*, FleetHouse Court, 18 Whitchurch Street, London WC1 7PF.

# A period history of the elements

**Allok McWhirter** presents a short routine on the first 20 elements in the Periodic Table. The program has been designed to run on the BBC B model B, but it should be quite easy to convert it to run on other microcomputers. The program tests your knowledge on the first 20 elements of the Periodic Table, as these are particularly useful for chemistry students.

The Periodic Table was mainly created by Dmitri Mendeleev (1834-1907), who used the relative atomic mass numbers of the different elements to work out their placing on the table. By studying these numbers, he was also able to leave gaps for elements which he thought must exist but had not yet been discovered. Mendeleev is credited with putting the table into its modern form.

As stated in the instructions, the program will test you on several basic facts about the given elements: the number of protons, neutrons or electrons; the valency; which ions are formed; or the electronic 'shell' arrangement.

For example, in the Periodic Table, oxygen is element Number 8 because it has 8 protons and 8 electrons in the neutral atom — this is called the relative atomic number.

There is a nucleus in the centre of each atom which contains the protons and neutrons. Electrons are arranged in different levels of 'shells' around the nucleus. Each level must be filled before the next is started.

Each element is stable (does not react easily with other elements) if it has its outer shell filled. For example, neon is very stable having 10 electrons — both the

first (2) and second (8) shells are filled.

If an element does not have a filled outer shell, it can form a compound with another element. An element with an almost empty last electron shell may lose an electron (giving it a complete shell) and, in so doing, may gain it as another element to complete an almost full shell. For example, hydrogen comprises one proton and one electron — the first shell is almost empty. Oxygen has a filled first shell (two electrons) and six electrons in its second shell — ie, oxygen is two electrons short of a complete second shell.

To make both the oxygen and hydrogen atoms stable, they join up to form water (H2O) — two hydrogen atoms join with one oxygen atom. Each hydrogen atom gives away one electron and becomes stable, while the oxygen atoms receive two electrons and also stabilize.

```

100 DATA 19, 2, 4, 6, 8, 0
20 REM **** ELEMENTS *****
30 REM *
40 REM * COPYRIGHT *
50 REM * OF *
60 REM * A.B.MCWHIRTER *
70 REM *****
80 REM *****
90 DIM A$(10),B$(21),B#(21,8)
100 CLS
110 RESTORE
120 SC=0:CD=0
130 PRINT:PRINT:PRINT
140 PRINT"***** ELEMENTS *****"
150 PRINT"This program has been designed to test"
160 PRINT"your knowledge of the first 20 elements"
170 PRINT"of the 'Periodic Table'. It will test"
180 PRINT"you on one of the following subjects"
190 PRINT
200 PRINT" 1) Number of protons "
210 PRINT" 2) Number of electrons "
220 PRINT" 3) Number of neutrons "
230 PRINT" 4) The electron arrangement "
240 PRINT" 5) The valency "
250 PRINT" 6) The ion"
260 PRINT
270 PRINT" It will ask you 20 questions and at the"
280 PRINT"end it will give you a percentage score"
290 PRINT" along with a comment on your perform-"
300 PRINT"ance."
310 PRINT
320 PRINT" PRESS RETURN TO CONTINUE...":INPUT Z$8
330 CLS
340 PRINT:PRINT:PRINT
350 PRINT"***** ELEMENTS *****"
360 PRINT" The answer to the questions on "
370 PRINT"protons, neutrons, electrons and "
380 PRINT"valency should be answered by a number"

```

```

200 PRINT "but the ion should be answered for."
400 PRINT "example by '2+' or 'Al+3' OR 'Li+' etc."
410 PRINT "no ion exists. The electron arrangement"
420 PRINT "should be answered like '2 8 8 1' "
430 PRINT;PRINT;PRINT;"PRESS RETURN TO EDITOR...";INPUT 228
440 FOR I=1 TO 100
450 DATA 111,"HOW MANY PROTONS IN"
460 DATA 121,"HOW MANY NEUTRONS IN"
470 DATA 131,"HOW MANY ELECTRONS IN"
480 DATA 141,"WHAT IS THE ELECTRON ARR'G OF"
490 DATA 151,"WHAT IS THE VALENCE OF"
500 DATA 161,"WHAT IS THE ION OF"
510 FOR I=1 TO 240:READ 211:NEXT I
520 FOR I=1 TO 10:FOR J=1 TO 8
530 READ 212,I,J
540 NEXT J:NEXT I
550 DATA "HYDROGEN", "HELIUM", "LITHIUM", "BERYLLIUM", "BORON", "CARBON", "TRITROBENZ",
"OXYGEN", "FLUORINE", "NITRO", "SODIUM", "MAGNESIUM", "ALUMINIUM", "SILICON", "PHOSPHORU",
"SELENIUM", "CHLORINE", "NITROGEN", "SODIUM", "MAGNESIUM", "CALCIUM"
560 DATA "1", "2", "3", "4", "5", "6", "7", "8"
570 DATA "1", "2", "3", "4", "5", "6", "7", "8"
580 DATA "1", "2", "3", "4", "5", "6", "7", "8"
590 DATA "1", "2", "3", "4", "5", "6", "7", "8"
600 DATA "1", "2", "3", "4", "5", "6", "7", "8"
610 DATA "1", "2", "3", "4", "5", "6", "7", "8"
620 DATA "1", "2", "3", "4", "5", "6", "7", "8"
630 DATA "1", "2", "3", "4", "5", "6", "7", "8"
640 DATA "1", "2", "3", "4", "5", "6", "7", "8"
650 DATA "1", "2", "3", "4", "5", "6", "7", "8"
660 DATA "1", "2", "3", "4", "5", "6", "7", "8"
670 DATA "1", "2", "3", "4", "5", "6", "7", "8"
680 DATA "1", "2", "3", "4", "5", "6", "7", "8"
690 DATA "1", "2", "3", "4", "5", "6", "7", "8"
700 DATA "1", "2", "3", "4", "5", "6", "7", "8"
710 DATA "1", "2", "3", "4", "5", "6", "7", "8"
720 DATA "1", "2", "3", "4", "5", "6", "7", "8"
730 DATA "1", "2", "3", "4", "5", "6", "7", "8"
740 DATA "1", "2", "3", "4", "5", "6", "7", "8"
750 DATA "1", "2", "3", "4", "5", "6", "7", "8"
760 FOR I=1 TO 20
770 N=INT(100*I)+1C = INT(1000*I)
780 IF A=0 OR E=0 THEN 770
790 CLS
800 PRINT;PRINT;PRINT;"***** ELEMENTS *****"
810 PRINT;PRINT;PRINT;PRINT;PRINT;"SCORE = ";B$1;" / "B$2
820 PRINT;PRINT;PRINT;PRINT
830 PRINT;PRINT;PRINT;PRINT;PRINT
840 IF B$1,B$2>=200THEN C=B$1:PRINT" REIGHT":FOR I=1 TO 100:NEXT I:GOTO 840
850 PRINT;"WRONG":PRINT"THE ANSWER WAS ";B$1,E$0:FOR I=1 TO 2000:NEXT I:GOTO 850
0 ELEMENT FP
070 FOR I=1 TO 200:NEXT
080 REMAIN RESULTS
090 CLS
100 GET T$(1):P$B="":THEN T$(0)
100 P$B$="Y":THEND=41031:GOTD220
210 P$B$="N":THEND=44024:SYS4050:GOTD220
215 GOTD1PO
220 FOR E$1,I,O:POKE#42,A:POKE#43,O:POKE#44,B:POKE#45,C:SYS(1)
READY.

```

# THE MicroComputer SOFTWARE CLUB

## FOR OWNERS OF VIC, ZX81, SPECTRUM, BBC, OR DRAGON MICROCOMPUTERS

Buying software for your computer is a gamble. Apart from the occasional review and, perhaps, a recommendation from a friend, you have precious little information upon which to base your purchasing decision.

Advertising and clever packaging can make the best programs appear tremendous. It is not until you have "handled" your money that you discover how good they really are. Some are only slightly different to others you may already own; many are not as good as you would be entitled to expect; and others are just a complete waste of money. Of course, there are some excellent programs around, and many more appear month. Now there is a safe way of finding out about them.

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THE MICROCOMPUTER SOFTWARE CLUB was started to make software purchasing easier, cheaper, and less risky. Membership is completely free of charge, as is the monthly Newsletter. Every month members receive full details on the best and latest programs available for their computer and, simply and confidentially, are able to order any of the programs they choose at substantially less than normal prices.

```
200 PRINT"  
210 PRINT"IT will ask you 20 questions and at the"  
220 PRINT"end it will give you a percentage score"  
230 PRINT"along with a comment on your perform-"  
240 PRINT"ance."  
250 PRINT  
260 PRINT" PRESS RETURN TO CONTINUE...":INPUT 229  
270 CLS  
280 PRINT:PRINT:PRINT  
290 PRINT"***** ELEMENTS *****"  
300 PRINT"The answer to the questions on "  
310 PRINT"protons, neutrons, electrons and "  
320 PRINT"valency should be answered by a number!"
```

### — large savings — on top software

All programs are, at least, 10% cheaper than normal and, each month, the best of the most recent software is made available to members at 20% less than normal. Postage and packing is free on orders of two or more programs for delivery within the UK; ordering and payment are simple, and quality is guaranteed.

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Our latest Newsletter offers programs from most leading suppliers - and from a few that, perhaps, you do not yet know. A program has to be good, very good, before it is recommended to members. It also has to be reliable and, even before the members' discount, it has to be good value for money. Subject coverage includes adventure, arcade, education, strategy games, household applications, family games, business, utilities and programming aids.

Remember, membership is completely free of charge and you are under no obligation to buy anything from The Club unless you really want to. If you own or use a ZX81, 16K Spectrum, 64K, BBC 64K or 128K, Dragon 32, or VIC (expanded or unexpanded), you should join THE CLUB.

## JOIN TODAY

THE MICROCOMPUTER SOFTWARE CLUB

P.O.Box 988, Oxford, OX2 9BA, England.

# When is an 8K Vic not an 8K Vic?

Peter Wilson explains how you can run unexpanded programs on an expanded Vic20.

I belong to a computer club. A lot of the members, including myself, complained that when the Vic's memory was expanded you could not run some unexpanded programs without removing the extra memory, or the Super Expander cartridge.

To overcome this problem, I have written a small program to reconfigure the Vic's memory. When Run, the program asks you to press a number between 1 and

6, which sets the relevant Pokes. If you press 1, this will reconfigure the Vic so that user Ram starts at 4096, screen Ram at 2860 and colour Ram at 3840. If you press 2, user Ram will start at 1624, screen Ram at 2860 and colour Ram at 3840.

Pressing 3, 4, 5 or 6 will reconfigure the Vic so that user Ram starts at 4096, screen Ram at 4096 and colour Ram at 3864. In addition, number 3 sets the Vic's memory at 8K+, without having the extra Ram — a condition that it could not set up on its own.

When this program is executed, it sets the Vic as if it had just been turned on and executes the reconfiguration program itself, so make a copy before running it.

One word of warning, do not try to set up a configuration which has Ram missing. For example, if you have an 8K expansion plugged in and you reconfigure to "Unexpanded Vic-34", it will phone 65535 bytes free, but the user Ram will not start at 1024 because you do not have any Ram there. Try running the program on an unexpanded Vic and pressing number 6 — you will see what 28680 bytes free code like. ■

## RECONFIGURATION

```

1 REM RECONFIGURATION
2 REM BY P.E.WILSON
3 REM VIC-PET COMPUTER
4 REM CLUB, CORBY.
50 POKE36879,27:DLR
50 PRINT" RECONFIGURATION"
50 PRINT" 1 UNEXPANDED VIC"
40 PRINT" 2 PLUS 3K"
50 PRINT" 3 PLUS 8K 6K+MEMORY"
50 PRINT" 4 PLUS 8K"
70 PRINT" 5 PLUS 16K"
80 PRINT" 6 PLUS 24K"
90 PRINT" PRESS 1 TO 6"
100 GOSUB1:IFB$="1"THENA=1:D=30:C=30
110 IFB$="1"THENA=1:D=30:C=30
120 IFB$="2"THENA=41:B=30:C=30
130 IFB$="3"THENA=191:B=32:C=16
140 IFB$="4"THENA=181:B=64:C=16
150 IFB$="5"THENA=191:B=96:C=16
160 IFB$="6"THENA=191:B=128:C=16
170 PRINT" LEAVE SUPER EXPANDER FUNCTIONS AVAILABLE?"
180 PRINT" Y OR N"
190 GOSUB1:IFB$="Y"THEN190=1:GOTO220
200 IFB$="N"THEN190=0:SYS4850:GOTO220
210 6570190
220 POKE&1,0:POKE&40,0:POKE&43,0:POKE&44,0:POKE&48,C:SYS48?
READY.

```







# Man made

**Keith and Steven Brain**  
explain how to add graphics  
to your own Dragon games.

In our last article, we looked at reaction timing and saw how a very simple idea became much more complicated as random factors and on-screen scoring were introduced. However, even at the end we were still only looking for the numbers one and two, which is not exactly challenging! Good games always have a story attached to them, so what about converting that program's action to a man game?

It is always a good idea to include the instructions in the title sequence (line 10). The Play command in line 20 is a useful way of causing the program to pause while the instructions are digested.

## Adding graphics

Let us consider how to make a low-resolution picture of a man, using characters 128 to 140, which consist of black and green blocks in varying arrangements. A black background is necessary, so we must change the default C64 command (green) to C60 (black).

The best way to design your figure is to use squared paper (either ordinary graph paper or fancy plotting sheets). Fit in squares to make the figure and divide it into  $2 \times 2$  blocks. You can then work out which characters these correspond to — referring to Appendix A of the Dragon manual if necessary — and put these numbers into a grid. If the number required is 128 you will have to find an alternative, as this is the same as the background colour we have set on the screen. For our man, the grid is  $3 \times 4$  and consists of the following characters:

```
128 128 128
128 128 128
128 128 128
```

Graphics characters on the Dragon cannot be called directly from the keyboard and must be accessed via the C60 handles. To avoid altering our original program any more than necessary, we will put the new part in a subroutine at line 1030. To Primitive the top part of our man at a particular position, we need to:

```
1020 MOVE 128 TO C60(CHR(128)) CHR(128)
```

The second row of characters needs to be one line (32 characters) below this although, as the first character is 128, it is simpler to ignore it and use:

```
1020 MOVE 128 TO C60(CHR(128))
```

Similarly, the last two rows are produced by:

```
1020 MOVE 128 TO C60(CHR(128)) CHR(128)
```

You can check what the figure looks like, and that you have entered the lines correctly, by trying Goto 1030. Finally, we must not forget to add a Return from the subroutine:

The next problem is working out where on the screen the figure can appear, if he is not to find himself drawn to pieces as the screen wraps round! We will restrict him to moving horizontally near the centre of the screen, and prevent wrap-around, by including  $(B > \text{RInt}(B)) + 256$  in line 110. This forces the figure to be drawn in one of the 30 positions following position 256 (i.e. on line 82).

110 B=0.5\*(RInt(B)+256) :D=82

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 PRINT "-" :D=82 :CHR(128)-20

1100 RETURN

1100 :PRINT "-" :D=82 :CHR(128)-20

1100 RETURN

to each of the C60 functions when C=2. There are many ways of doing this, such as by adding another variable to the C60 codes in lines 1030-1060 and setting it to '1' if C=2 or '0' if C=1.

1100 :PRINT "-" :D=82 :CHR(128)-20

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 MOVE 128 TO C60(CHR(128)) CHR(128)

1100 PRINT "-" :D=82 :CHR(128)-20

1100 RETURN

1100 :PRINT "-" :D=82 :CHR(128)-20

1100 RETURN

Your success and failure rate is kept as before, with D and E. The average reaction time is also now updated in 1010 in each cycle:

1000 :PRINT "AVERAGE = " ;T :PRINT "RT = " ;RT :PRINT "DT = " ;DT

The logic has had to be modified a little, as success here only comes if you hit a key when the yellow man appears! If you fire at your own man, or miss one of the yellow puffs, there is a fair random chance that you will see one of your own men. The length of time for which the figure is displayed is also rather shorter and varies.

Instead of figures, a Histogram-type graphic status display has been included in the screen update line 20:

20 C60 PRINT "-"; T --- :PRINT "-"; RT --- :PRINT "AVERAGE"; DT --- :PRINT "DT"; CHR(128); RT --- :PRINT "CHR(128)"

Yellow bands appear at the top of the screen to mark the number of enemy killed. The number of times C60(140) is printed depends on the variable D. It is easier to count down than up with a For-Next loop, as the minimum number of loops is one. Also, the statements Print(1), and Print(2), C60(128), are required to start the histogram correctly on the left margin of the screen, by wiping out the previous first block produced at the end of the previous line. Green bands appear more easily via D at the bottom to mark your surviving men!

## End of game

The end of the game is reached when you have killed all the enemy ( $D=10$ ), or all your men are dead ( $D=0$ ). As your proficiency increases, you can alter these numbers. There is easily room for a display of more than 100 dead enemy.

The win and lose reports (at 2000 and 2001) tell you the final state of the forces and give an indication of your average reaction time. This is kept to two decimal places by means of the Print Using \$1.2 format, or the TPrint formatting command.

Now that we have seen how simple graphics can be produced and introduced into a game, we are ready to explore moving graphics with cursor and joystick control, see next week.

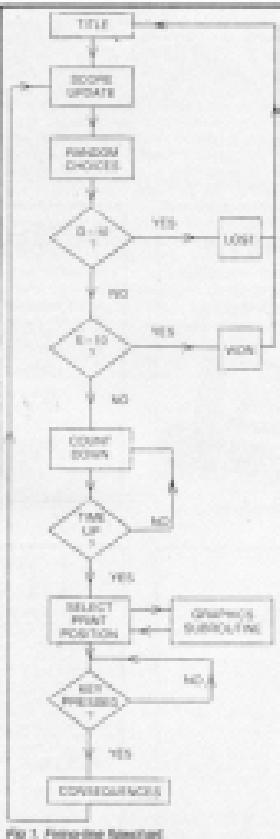


Fig 1. Programme flowchart



Fig 2. Constructing the picture of a man from Metamix characters.

## FULL PROGRAM LISTING

```

5 REM FIRING LINE COPYRIGHT K & S BRAIN 198283
10 REM TITLE & INSTRUCTIONS
20 CLS:PRINT#171,"FIRING LINE":PRINT#257,"PRESS
ANY KEY TO FIRE AT YOUR":PRINT#259,"ENEMY - THE
YELLOW PERIL":PRINT#255,"BUT BE SURE NOT TO
SHOOT YOUR":PRINT#423,"GREEN-COATED NATES!":
30 PLAY":$=CHR(250)G=CHR(251)D=CHR(252)P=CHR(253)
R=CHR(254)C=CHR(255)O=CHR(256)A=CHR(257)H=CHR(258)
40 REM SCREEN UPDATE
50 ELSE:PRINT#31,"":FORI=1TO E:PRINT#CHR#(149):NEXT
:PRINT#31,CHR#(128),:PRINT#448,"":FORI=1TO
(18-D):PRINT#CHR#(133):NEXT
60 REM RANDOM TIME AND GRAPHIC COLOUR : CHECK FOR
END OF GAME
70 IF#(DX 588)>(CHR#(21)):IF#(I=10THENEND ELSE IF
E=10THENEND
80 REM INITIAL WAIT TIME COUNTDOWN
90 FORI=1:IF#(I>10THENEND
100 REM CHOOSE PRINT POSITION : GOTO TO GRAPHICS
SUBROUTINE
110 R=RDY#(38)+255:SOUND#255,1:GOSUB1000
115 REM RANDOM NUMBER OF CHECKS FOR KEY PRESS
120 TIME#=0:FORI=1TO#DX#(58+58):R#=IKEY#:
125 REM CONSEQUENCES OF KEY PRESS
130 IF#(R#=="" THENNEXT:IF#(I>2THEN SOUND#15,10:
D=D+RDY#(1):GOTOS9):ELSE SOUND#158,5:GOTOS9
140 IFC#(I>1 THEN SOUND#1,10:D=D+RDY#(1):GOTOS9
1600 REM GRAPHICS SUBROUTINE : SELECT GREEN OR
YELLOW CHARACTERS
1610 SOUND#255,5:I#(E+1)=T#(CT+TIMER)+2:GOTOS9
1620 IFC#(I>2 THEN G#(E) ELSE G#0
1630 PRINT#8,(CHR#(129+G)),(CHR#(135+G)),(CHR#(131+G)),
1640 PRINT#8,(B#(33)),(CHR#(133+G))
1650 PRINT#8,(B#(65)),(CHR#(142+G)),(CHR#(136+G)),
1660 PRINT#8,(B#(97)),(CHR#(136+G)),(CHR#(136+G)):RETURN
2600 REM YOU LOST
2610 CLS:PRINT#41,"YOU JUST
LOST":PRINT#71,"YOUR LAST COMRADE":,SOUND#1,18
2620 PRINT#228,"BUT YOU KILLED",E,"ENEMY":
2630 PRINT#322,"YOUR AVERAGE ACCURATE
FIRING":PRINT#368,"TIME WAS":,PRINT
USING"###,##":T:,SOUND#1,18
2640 FORI=255TO1STEP=-5:SOUND#1,1:NEXT:RUN
3400 REM YOU WON
3510 CLS:FORI=1TO255STEP5:SOUND#1,1:NEXT
3600 PRINT#405,"CONGRATULATIONS":PRINT#97,"YOU
DESTROYED THE ENEMY FORCE!":
3630 PRINT#226,"YOU LOST",D,"OF YOUR MEN!":
SOUND#1,D+1:PRINT#290,"YOUR AVERAGE ACCURATE
FIRING":PRINT#326,"TIME WAS":,PRINT
USING"###,##":T:,SOUND#1,T:,18:RUN

```











## GONE FISHING GONE AWAY

L.H. Thomas of Bright Ideas, Huddersfield, North, writes:

**Q** I recently bought a game called the "Telegames Entertainment Centre". I have managed to buy about four games for it, but it now seems impossible to obtain any more. I did write to the manufacturer, but received my letter back marked "gone away", so I presume that the company has folded. In Popular Computing Weekly I read that the Games Centre in Oxford Street sells all sorts of computer games. Do you know if they stock them for my computer game? If not, do you know anyone who does?

**A** I wrote in and spoke to someone at the "Games Centre". Although they had heard of the Telengames, they knew nothing about it — it was only a name to them. They do not, and never have, stocked games for it. Perhaps one of our readers can help?

## CONSULT THE ORACLE

Mervyn Quail of Manor Way, Michael, Surrey, writes:

**Q** I am 10 and at present am using a ZX81. I wish to progress to an Osborne, as announced in your issue 26, but I am unclear on a few points:

a) Will BASIC be available on just the 48K version?

b) How much RAM will be available to the user on the 16K machine?

c) How many more definable graphics will there be, and will the character set include fancy-case characters?

d) What will the tape transfer rate be?

**A** RAM will only be available on the 48K version. The amount of user RAM de-

pends on whether you are in high-res, or normal mode. If you are in normal mode, then you will have to use the Grab command to access the balance of the screen space otherwise reserved for high-res. This is not as complicated as it sounds. In high-res there should be about 9K available to the user.

The tape transfer rate will be either 2000 baud, or 300 baud if you want to take extra care against corruption. The whole character set is selectable on the Osborne. For further details, see our review of the Osborne in Popular Computing Weekly, January 18.

## A LIGHTER SHADE OF PALE

Kathy Wiesen of Hardback Gardens, Abergavenny, Gwent, writes:

**Q** Can you give me details of how a light pen works, specifically for the BBC machine? Are there several different kinds? How easy would it be to make a light pen, assuming that the analogue interface was already installed?

**A** Basically, a light pen uses a photo transistor to measure the change of resistance caused by light between a collector and emitter. You will need to use a BBC B machine, because the A chips don't have the necessary prebias pot.

The pen will read whether a dot is colour, or black and white. There is a special register in the 6569 chip to control it. This register is accessible from Basic.

You should have no problems in fitting a light pen, if you already have an analogue-to-digital converter. If not, there is a circuit diagram and all the necessary instructions in Stephen Adam's book, 20 Electronics Projects available from Interface.

## WHOSE FAULT IS IT ANYWAY?

Michael Whitehead of Power Road, Grange 836, South Africa, writes:

**Q** I have been considering buying a ZX Spectrum and would like to know about the faults in the Home. Are the latest ROMs improved or will an updated ROM be brought out by Sinclair?

What advantages does the Atari 800 have over the ZX81? Can the ROM be updated to include the features found in the ZX81?

**A** The faults in the Spectrum ROMs are not immediately noticeable to the average user. As long as the user stays in Basic there will be little difference. The only two faults are that Screen cannot be concatenated, and that if you hold a key down on a keyboard, the cursor will not change and the keyboard will be reported.

Most errors will only affect machine code programs. There is also a section of redundant Z8011 code in the ROM. The best place to look for details of these is in Ian Logan's book, Understanding Your Spectrum published by Melbourne House.

The Atari 800 features a full keyboard, unlike the membrane on the ZX81. It also has a composite video-output, to enable it to be used with either a colour or black and white monitor. The Atari 800 is, strictly speaking, limited to 16K. A 48K memory expansion is available from Maplin, although this costs the Atari guarantee.

## MACHINE CODE WANTED

Selwyn Cooper of Horsham, West Sussex, writes:

**Q** I have a Vic 20 and would like to know why no one seems to publish machine code programs for it, including you. Are they particularly difficult to write? Could you please publish one for the unexpanded Vic — you

**Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem Peek & Poke will answer it. And every week we'll have a new question and every week we'll have a new answer. The address is Peek & Poke, PCW, Holthouse Court, 18 Whitcomb Street, London WC3 7HF.**

## Top 10

Rank	Editor for Computer Games	Marketing Director
1	Stephen Langford: Programming in the BBC home computer	Mark Lewis: Commodore 64
2	John Williams: Using the BBC in business	John Williams: Commodore 64
3	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
4	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
5	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
6	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
7	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
8	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
9	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64
10	Stephen Langford: Programming in the BBC home computer	John Williams: Commodore 64



## Say what you mean

The problem of the meaning of lines of program text — in the case of BASIC or any other language — is a key way into the territories of artificial intelligence.

There are two principal aspects. What does this perfectly legal code mean and — can we find it is easy to always decide what it means, in any case?

O. Nilsenius-Parkinson (Parkinson's Law, 1962) posed these same questions for intelligence tests "... high marks are gained by those who subsequently prove to be practically illiterate. So much time has been spent in studying the art of being tested. But the candidate rarely has time for anything else". Parkinson was stressing that, though the candidate might be able to define the meaning of a question in any intelligence test and had learnt the rules for it, this did not mean that he would be able to understand or convey meanings outside the narrow boundaries of the tests.

Though not always true, generally speaking a line:

`IF A = 7 THEN GO TO 2000 PRINT "B"`

is not as it would appear at first sight. You might expect given general rules about statements and the use of colons to distinguish statements, that if A and 7 were not equal control would pass to the statement which contained the Print command. This does not often happen.

What actually happens is that the Print command and any other statements on that line is ignored. We have no control undefinitions; if an if statement, control moves to the next line if not treated as equivalent to control moving to

the statement after the colon which is supposed to be the same.

I would guess that when this ambiguity was first discovered it had not been foreseen. As with many aspects of programming, things end up which have not been predicted and whose meaning is unknown — but which are not illegal.

The decision to proceed with the standard way of interpreting the meaning (to ignore any other statements on the same line, if the if is false) is not based on the existence of some clear and unambiguous interpretation of the meaning. It happens because that is the way the interpreter works.

It cannot say what Line 1000 means without adding its own original rules (in this case based on what another system, the interpreter, does). In any system of rules, there will be instances which cannot be examined by the rules, but which are not outside the range of the rules. These same cases can be used to question the possibility of artificial intelligence. If a machine-reasoned line can cope with things such as Line 1000 (which was not able to produce anything if the rules cannot be composed), Turing also showed that there could be no such thing as a universal decision procedure, which would allow you to establish meaning in every case. Though this interpretation was used to decide on the effect of Line 1000, it cannot always be so used.

It is more (intentional) language (Pascal) we are come across problems. The one from last week:

`IF A = 7 THEN B := 2 ELSE C := 2 END IF B = 2`

which is a composite of two IF Then Else statements. To which if does the Else refer? The ad hoc solution (from the interpreter) is to make the Else refer to the second. The subject of much debate (called the "compiling" Else in computer science), it shows that even for a more carefully designed language there are many problems.

In anything as complex as a computing machine it is impossible to predict all possible contingencies (there can be no universal decision procedure) and this accounts for many "bugs", and the many unknowns and undocumented features which appear with use.

The designer of a computer never knows what it can really do.

Boris Jukas

## Top 10

Rank	Programmer	Language	Platform	Score
1	Steve Parker	Basic	Amstrad	1000
2	David Goss	Basic	Amstrad	999
3	Mike	Basic	Amstrad	998
4	Paul	Basic	Amstrad	997
5	John	Basic	Amstrad	996
6	Mark	Basic	Amstrad	995
7	Mike	Basic	Amstrad	994
8	Mike	Basic	Amstrad	993
9	Mike	Basic	Amstrad	992
10	Mike	Basic	Amstrad	991

Rank	Programmer	Language	Platform	Score
1	Mike	Basic	Amstrad	1000
2	Mike	Basic	Amstrad	999
3	Mike	Basic	Amstrad	998
4	Mike	Basic	Amstrad	997
5	Mike	Basic	Amstrad	996
6	Mike	Basic	Amstrad	995
7	Mike	Basic	Amstrad	994
8	Mike	Basic	Amstrad	993
9	Mike	Basic	Amstrad	992
10	Mike	Basic	Amstrad	991

Rank	Programmer	Language	Platform	Score
1	Mike	Basic	Amstrad	1000
2	Mike	Basic	Amstrad	999
3	Mike	Basic	Amstrad	998
4	Mike	Basic	Amstrad	997
5	Mike	Basic	Amstrad	996
6	Mike	Basic	Amstrad	995
7	Mike	Basic	Amstrad	994
8	Mike	Basic	Amstrad	993
9	Mike	Basic	Amstrad	992
10	Mike	Basic	Amstrad	991

## Puzzle

# The square root of PCW

### Puzzle No. 43

Here is what is called an Alphametic, in which letters have been substituted for the digits 0 to 9 (zero is not used).

$\sqrt{\text{SQUARE}} = \text{PCW}$

It is obvious that every square has a square root, but can you find the number that PCW stands for? Careful, though — there may be more than one possible answer.

### Solution to Puzzle No. 41

The maximum value for each digit, when added to its original value, is 9. So for 2, 3 or 4 digit numbers the maximum sums of cubes are 1458, 2187, and 2916, respectively. However, with five digits the maximum possible sum is 3645 ( $9 = 9^5 - 1$ ) — less than four figures.

Therefore, numbers of three or more digits are not possible. Clearly, as the four digit total can only equal a maximum of 3645 we can, by continuing the process of reasoning, reduce the range of numbers to be tested to those under 1999.

So 1999 = 1 + 1998 = 1998 + 1

or 1998 = 1 + 1997 = 1997 + 1

or 1997 = 1 + 1996 = 1996 + 1 = 1996 + 1 + 1995 = 1995 + 1 + 1994 = 1994 + 1 + 1993 = 1993 + 1 + 1992 = 1992 + 1 + 1991 = 1991 + 1 + 1990 = 1990 + 1 + 1989 = 1989 + 1 + 1988 = 1988 + 1 + 1987 = 1987 + 1 + 1986 = 1986 + 1 + 1985 = 1985 + 1 + 1984 = 1984 + 1 + 1983 = 1983 + 1 + 1982 = 1982 + 1 + 1981 = 1981 + 1 + 1980 = 1980 + 1 + 1979 = 1979 + 1 + 1978 = 1978 + 1 + 1977 = 1977 + 1 + 1976 = 1976 + 1 + 1975 = 1975 + 1 + 1974 = 1974 + 1 + 1973 = 1973 + 1 + 1972 = 1972 + 1 + 1971 = 1971 + 1 + 1970 = 1970 + 1 + 1969 = 1969 + 1 + 1968 = 1968 + 1 + 1967 = 1967 + 1 + 1966 = 1966 + 1 + 1965 = 1965 + 1 + 1964 = 1964 + 1 + 1963 = 1963 + 1 + 1962 = 1962 + 1 + 1961 = 1961 + 1 + 1960 = 1960 + 1 + 1959 = 1959 + 1 + 1958 = 1958 + 1 + 1957 = 1957 + 1 + 1956 = 1956 + 1 + 1955 = 1955 + 1 + 1954 = 1954 + 1 + 1953 = 1953 + 1 + 1952 = 1952 + 1 + 1951 = 1951 + 1 + 1950 = 1950 + 1 + 1949 = 1949 + 1 + 1948 = 1948 + 1 + 1947 = 1947 + 1 + 1946 = 1946 + 1 + 1945 = 1945 + 1 + 1944 = 1944 + 1 + 1943 = 1943 + 1 + 1942 = 1942 + 1 + 1941 = 1941 + 1 + 1940 = 1940 + 1 + 1939 = 1939 + 1 + 1938 = 1938 + 1 + 1937 = 1937 + 1 + 1936 = 1936 + 1 + 1935 = 1935 + 1 + 1934 = 1934 + 1 + 1933 = 1933 + 1 + 1932 = 1932 + 1 + 1931 = 1931 + 1 + 1930 = 1930 + 1 + 1929 = 1929 + 1 + 1928 = 1928 + 1 + 1927 = 1927 + 1 + 1926 = 1926 + 1 + 1925 = 1925 + 1 + 1924 = 1924 + 1 + 1923 = 1923 + 1 + 1922 = 1922 + 1 + 1921 = 1921 + 1 + 1920 = 1920 + 1 + 1919 = 1919 + 1 + 1918 = 1918 + 1 + 1917 = 1917 + 1 + 1916 = 1916 + 1 + 1915 = 1915 + 1 + 1914 = 1914 + 1 + 1913 = 1913 + 1 + 1912 = 1912 + 1 + 1911 = 1911 + 1 + 1910 = 1910 + 1 + 1909 = 1909 + 1 + 1908 = 1908 + 1 + 1907 = 1907 + 1 + 1906 = 1906 + 1 + 1905 = 1905 + 1 + 1904 = 1904 + 1 + 1903 = 1903 + 1 + 1902 = 1902 + 1 + 1901 = 1901 + 1 + 1900 = 1900 + 1 + 1899 = 1899 + 1 + 1898 = 1898 + 1 + 1897 = 1897 + 1 + 1896 = 1896 + 1 + 1895 = 1895 + 1 + 1894 = 1894 + 1 + 1893 = 1893 + 1 + 1892 = 1892 + 1 + 1891 = 1891 + 1 + 1890 = 1890 + 1 + 1889 = 1889 + 1 + 1888 = 1888 + 1 + 1887 = 1887 + 1 + 1886 = 1886 + 1 + 1885 = 1885 + 1 + 1884 = 1884 + 1 + 1883 = 1883 + 1 + 1882 = 1882 + 1 + 1881 = 1881 + 1 + 1880 = 1880 + 1 + 1879 = 1879 + 1 + 1878 = 1878 + 1 + 1877 = 1877 + 1 + 1876 = 1876 + 1 + 1875 = 1875 + 1 + 1874 = 1874 + 1 + 1873 = 1873 + 1 + 1872 = 1872 + 1 + 1871 = 1871 + 1 + 1870 = 1870 + 1 + 1869 = 1869 + 1 + 1868 = 1868 + 1 + 1867 = 1867 + 1 + 1866 = 1866 + 1 + 1865 = 1865 + 1 + 1864 = 1864 + 1 + 1863 = 1863 + 1 + 1862 = 1862 + 1 + 1861 = 1861 + 1 + 1860 = 1860 + 1 + 1859 = 1859 + 1 + 1858 = 1858 + 1 + 1857 = 1857 + 1 + 1856 = 1856 + 1 + 1855 = 1855 + 1 + 1854 = 1854 + 1 + 1853 = 1853 + 1 + 1852 = 1852 + 1 + 1851 = 1851 + 1 + 1850 = 1850 + 1 + 1849 = 1849 + 1 + 1848 = 1848 + 1 + 1847 = 1847 + 1 + 1846 = 1846 + 1 + 1845 = 1845 + 1 + 1844 = 1844 + 1 + 1843 = 1843 + 1 + 1842 = 1842 + 1 + 1841 = 1841 + 1 + 1840 = 1840 + 1 + 1839 = 1839 + 1 + 1838 = 1838 + 1 + 1837 = 1837 + 1 + 1836 = 1836 + 1 + 1835 = 1835 + 1 + 1834 = 1834 + 1 + 1833 = 1833 + 1 + 1832 = 1832 + 1 + 1831 = 1831 + 1 + 1830 = 1830 + 1 + 1829 = 1829 + 1 + 1828 = 1828 + 1 + 1827 = 1827 + 1 + 1826 = 1826 + 1 + 1825 = 1825 + 1 + 1824 = 1824 + 1 + 1823 = 1823 + 1 + 1822 = 1822 + 1 + 1821 = 1821 + 1 + 1820 = 1820 + 1 + 1819 = 1819 + 1 + 1818 = 1818 + 1 + 1817 = 1817 + 1 + 1816 = 1816 + 1 + 1815 = 1815 + 1 + 1814 = 1814 + 1 + 1813 = 1813 + 1 + 1812 = 1812 + 1 + 1811 = 1811 + 1 + 1810 = 1810 + 1 + 1809 = 1809 + 1 + 1808 = 1808 + 1 + 1807 = 1807 + 1 + 1806 = 1806 + 1 + 1805 = 1805 + 1 + 1804 = 1804 + 1 + 1803 = 1803 + 1 + 1802 = 1802 + 1 + 1801 = 1801 + 1 + 1800 = 1800 + 1 + 1799 = 1799 + 1 + 1798 = 1798 + 1 + 1797 = 1797 + 1 + 1796 = 1796 + 1 + 1795 = 1795 + 1 + 1794 = 1794 + 1 + 1793 = 1793 + 1 + 1792 = 1792 + 1 + 1791 = 1791 + 1 + 1790 = 1790 + 1 + 1789 = 1789 + 1 + 1788 = 1788 + 1 + 1787 = 1787 + 1 + 1786 = 1786 + 1 + 1785 = 1785 + 1 + 1784 = 1784 + 1 + 1783 = 1783 + 1 + 1782 = 1782 + 1 + 1781 = 1781 + 1 + 1780 = 1780 + 1 + 1779 = 1779 + 1 + 1778 = 1778 + 1 + 1777 = 1777 + 1 + 1776 = 1776 + 1 + 1775 = 1775 + 1 + 1774 = 1774 + 1 + 1773 = 1773 + 1 + 1772 = 1772 + 1 + 1771 = 1771 + 1 + 1770 = 1770 + 1 + 1769 = 1769 + 1 + 1768 = 1768 + 1 + 1767 = 1767 + 1 + 1766 = 1766 + 1 + 1765 = 1765 + 1 + 1764 = 1764 + 1 + 1763 = 1763 + 1 + 1762 = 1762 + 1 + 1761 = 1761 + 1 + 1760 = 1760 + 1 + 1759 = 1759 + 1 + 1758 = 1758 + 1 + 1757 = 1757 + 1 + 1756 = 1756 + 1 + 1755 = 1755 + 1 + 1754 = 1754 + 1 + 1753 = 1753 + 1 + 1752 = 1752 + 1 + 1751 = 1751 + 1 + 1750 = 1750 + 1 + 1749 = 1749 + 1 + 1748 = 1748 + 1 + 1747 = 1747 + 1 + 1746 = 1746 + 1 + 1745 = 1745 + 1 + 1744 = 1744 + 1 + 1743 = 1743 + 1 + 1742 = 1742 + 1 + 1741 = 1741 + 1 + 1740 = 1740 + 1 + 1739 = 1739 + 1 + 1738 = 1738 + 1 + 1737 = 1737 + 1 + 1736 = 1736 + 1 + 1735 = 1735 + 1 + 1734 = 1734 + 1 + 1733 = 1733 + 1 + 1732 = 1732 + 1 + 1731 = 1731 + 1 + 1730 = 1730 + 1 + 1729 = 1729 + 1 + 1728 = 1728 + 1 + 1727 = 1727 + 1 + 1726 = 1726 + 1 + 1725 = 1725 + 1 + 1724 = 1724 + 1 + 1723 = 1723 + 1 + 1722 = 1722 + 1 + 1721 = 1721 + 1 + 1720 = 1720 + 1 + 1719 = 1719 + 1 + 1718 = 1718 + 1 + 1717 = 1717 + 1 + 1716 = 1716 + 1 + 1715 = 1715 + 1 + 1714 = 1714 + 1 + 1713 = 1713 + 1 + 1712 = 1712 + 1 + 1711 = 1711 + 1 + 1710 = 1710 + 1 + 1709 = 1709 + 1 + 1708 = 1708 + 1 + 1707 = 1707 + 1 + 1706 = 1706 + 1 + 1705 = 1705 + 1 + 1704 = 1704 + 1 + 1703 = 1703 + 1 + 1702 = 1702 + 1 + 1701 = 1701 + 1 + 1700 = 1700 + 1 + 1699 = 1699 + 1 + 1698 = 1698 + 1 + 1697 = 1697 + 1 + 1696 = 1696 + 1 + 1695 = 1695 + 1 + 1694 = 1694 + 1 + 1693 = 1693 + 1 + 1692 = 1692 + 1 + 1691 = 1691 + 1 + 1690 = 1690 + 1 + 1689 = 1689 + 1 + 1688 = 1688 + 1 + 1687 = 1687 + 1 + 1686 = 1686 + 1 + 1685 = 1685 + 1 + 1684 = 1684 + 1 + 1683 = 1683 + 1 + 1682 = 1682 + 1 + 1681 = 1681 + 1 + 1680 = 1680 + 1 + 1679 = 1679 + 1 + 1678 = 1678 + 1 + 1677 = 1677 + 1 + 1676 = 1676 + 1 + 1675 = 1675 + 1 + 1674 = 1674 + 1 + 1673 = 1673 + 1 + 1672 = 1672 + 1 + 1671 = 1671 + 1 + 1670 = 1670 + 1 + 1669 = 1669 + 1 + 1668 = 1668 + 1 + 1667 = 1667 + 1 + 1666 = 1666 + 1 + 1665 = 1665 + 1 + 1664 = 1664 + 1 + 1663 = 1663 + 1 + 1662 = 1662 + 1 + 1661 = 1661 + 1 + 1660 = 1660 + 1 + 1659 = 1659 + 1 + 1658 = 1658 + 1 + 1657 = 1657 + 1 + 1656 = 1656 + 1 + 1655 = 1655 + 1 + 1654 = 1654 + 1 + 1653 = 1653 + 1 + 1652 = 1652 + 1 + 1651 = 1651 + 1 + 1650 = 1650 + 1 + 1649 = 1649 + 1 + 1648 = 1648 + 1 + 1647 = 1647 + 1 + 1646 = 1646 + 1 + 1645 = 1645 + 1 + 1644 = 1644 + 1 + 1643 = 1643 + 1 + 1642 = 1642 + 1 + 1641 = 1641 + 1 + 1640 = 1640 + 1 + 1639 = 1639 + 1 + 1638 = 1638 + 1 + 1637 = 1637 + 1 + 1636 = 1636 + 1 + 1635 = 1635 + 1 + 1634 = 1634 + 1 + 1633 = 1633 + 1 + 1632 = 1632 + 1 + 1631 = 1631 + 1 + 1630 = 1630 + 1 + 1629 = 1629 + 1 + 1628 = 1628 + 1 + 1627 = 1627 + 1 + 1626 = 1626 + 1 + 1625 = 1625 + 1 + 1624 = 1624 + 1 + 1623 = 1623 + 1 + 1622 = 1622 + 1 + 1621 = 1621 + 1 + 1620 = 1620 + 1 + 1619 = 1619 + 1 + 1618 = 1618 + 1 + 1617 = 1617 + 1 + 1616 = 1616 + 1 + 1615 = 1615 + 1 + 1614 = 1614 + 1 + 1613 = 1613 + 1 + 1612 = 1612 + 1 + 1611 = 1611 + 1 + 1610 = 1610 + 1 + 1609 = 1609 + 1 + 1608 = 1608 + 1 + 1607 = 1607 + 1 + 1606 = 1606 + 1 + 1605 = 1605 + 1 + 1604 = 1604 + 1 + 1603 = 1603 + 1 + 1602 = 1602 + 1 + 1601 = 1601 + 1 + 1600 = 1600 + 1 + 1599 = 1599 + 1 + 1598 = 1598 + 1 + 1597 = 1597 + 1 + 1596 = 1596 + 1 + 1595 = 1595 + 1 + 1594 = 1594 + 1 + 1593 = 1593 + 1 + 1592 = 1592 + 1 + 1591 = 1591 + 1 + 1590 = 1590 + 1 + 1589 = 1589 + 1 + 1588 = 1588 + 1 + 1587 = 1587 + 1 + 1586 = 1586 + 1 + 1585 = 1585 + 1 + 1584 = 1584 + 1 + 1583 = 1583 + 1 + 1582 = 1582 + 1 + 1581 = 1581 + 1 + 1580 = 1580 + 1 + 1579 = 1579 + 1 + 1578 = 1578 + 1 + 1577 = 1577 + 1 + 1576 = 1576 + 1 + 1575 = 1575 + 1 + 1574 = 1574 + 1 + 1573 = 1573 + 1 + 1572 = 1572 + 1 + 1571 = 1571 + 1 + 1570 = 1570 + 1 + 1569 = 1569 + 1 + 1568 = 1568 + 1 + 1567 = 1567 + 1 + 1566 = 1566 + 1 + 1565 = 1565 + 1 + 1564 = 1564 + 1 + 1563 = 1563 + 1 + 1562 = 1562 + 1 + 1561 = 1561 + 1 + 1560 = 1560 + 1 + 1559 = 1559 + 1 + 1558 = 1558 + 1 + 1557 = 1557 + 1 + 1556 = 1556 + 1 + 1555 = 1555 + 1 + 1554 = 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